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Jorg Muller

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EXAMINER

HURST, JONATHAN M

ART UNIT

PAPER NUMBER

1775

NOTIFICATION DATE

DELIVERY MODE

03/24/2011

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

euspto@slepatents.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/560,516	<b>Applicant(s)</b> MULLER ET AL.	
	<b>Examiner</b> JONATHAN M. HURST	<b>Art Unit</b> 1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 January 2011.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 22-36, 38-39, and 44 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 22-36, 38, 39 and 44 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12/13/2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 22-26, 34-36, 38-39, and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bakajin et al. (US 7,290,667) in view of Bailey et al. (US 5,569,501) and in view of Tipler et al. (US 6,652,625).

Regarding the claims 22-26, 34-35 and 44 directed to a device it is noted that claim limitations directed to the method by which the device is made, i.e. by using PECVD are not given patentable weight in the product claims. Even though a product-by-process is defined by the process steps by which the product is made, determination of patentability is based on the product itself and does not depend on its method of

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production. In re Thorpe, 777 F.2d 695, 227 USPQ 964 (Fed. Cir. 1985). As the court stated in Thorpe, 777 F.2d at 697, 227 USPQ at 966 (The patentability of a product does not depend on its method of production. In re Pilkington, 411 F.2d 1345, 1348, 162 USPQ 145, 147 (CCPA 1969). If the product in a product-by-process claim is the same or obvious as the product of the prior art, the claim is unpatentable even though the prior art product was made by a different process.). See MPEP 2113 and 2114.

Regarding claims 22 and 44 Bakajin et al. discloses a miniaturized gas chromatograph comprising a miniaturized separation column and a miniaturized device for the storage and/or enrichment of molecules or atoms, or both, especially for a miniaturized gas chromatograph, (See Abstract and Col. 5 Line44-Col. 6 Line 10)

Said miniaturized device for the storage and enrichment comprises a silicon wafer wherein an inlet opening and an outlet opening are incorporated into said silicon wafer . (See Col. 3Lines 50-65 and Figure 3 where a channel is formed in a silicon wafer and said channel has an inlet and outlet is shown and further it is inherent that when fluid is meant to flow through a channel said channel must have an inlet and outlet)

The device further comprising a layer of a filling material deposited onto said silicon wafer, (See Abstract and Figure 1A-1D carbon nanofibers 14) further comprising a cover layer covering said filling material layer, (See Col. 3 Lines 40-46 and Figure 1D cover 15) said inlet opening and said outlet opening, thus forming a channel-like chamber comprising the filling material, wherein said inlet opening and said outlet

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opening are both connected via a connection to the chamber thus forming an inlet and an outlet for the delivery and extraction of a sample of molecules or atoms, or both.

(See Fig. 1D, Fig. 2 and Fig. 3 where a covered channel forms a chamber with an inlet and outlet connected to said chamber and fully capable of being for the delivery and extraction of sample molecules.)

Bakajin does not specifically disclose the miniaturized device wherein the filling material is covered by at least one layer of amorphous carbon.

Bailey et al. discloses the use of a layer of amorphous carbon, Diamond-Like carbon, which is deposited onto a substrate, including silicon substrates, and used as a coating, i.e. cover and wherein said Diamond-Like carbon is deposited on objects using PECVD. (See Abstract and Col. 1 Lines 23-30)

It would have been obvious to one of ordinary skill in the art at the time of invention to deposit a layer of amorphous Diamond-Like carbon onto a device as described by Bailey et al. in the miniaturized device as described by Bakajin et al. because Diamond-Like Carbon is known in the art to provide a cover layer or coating as required by Bakajin (See Bailey Abstract and Col. 1 Lines 23-30 and also see Bakajin Col. 3 Lines 40-45) and Diamond-Like carbon is a known stable, hard, and scratch resistant material useful in coating, i.e. covering, and a wide variety of other applications and represents a known suitable hard and thermally stable material suitable for covering

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and coating materials such as silicon as is required by the cover of Bailey. (See Bailey Abstract and Col. 1 Lines 8-30)

Modified Bakajin further discloses the use of chemical vapor deposition being used to deposit and form the filling material in the substrate and while modified may not specifically disclose the use of a Plasma Enhanced Chemical Vapor Deposition (PECVD) method for depositing the filling material it would have been obvious to one of ordinary skill in the art at the time of invention to use PECVD to deposit the filling material because PECVD represents one of a limited number of forms of CVD and a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, depositing a filling material, it is likely the product not of innovation but of ordinary skill and common sense.

Modified Bakajin discloses using the device in gas chromatography systems in order to perform more targeted gas chromatography but does not specifically disclose the outlet of the chamber being directly connected to the separation column of a gas chromatograph.

Tipler et al. discloses a gas chromatography system where in there is a pre-concentrator comprising a chamber packed with a material therein to concentrate analytes. The outlet of the chamber is directly connected to the inlet of a separation column of a gas chromatograph. (See Fig. 6 and Col. 4 Lines 32-53 where the outlet 72 of a chamber 26 is connected to a separation column 80 of a gas chromatograph)

It would have been obvious to one of ordinary skill in the art at the time of invention to connect the outlet of a chamber for concentrating materials as described by modified Bakajin et al. to the inlet of separation column of a gas chromatograph as described by Tipler et al. because it is well known in the art to connect the outlet of analyte concentrating chamber to the inlet of gas chromatograph separation column in order to perform accurate analysis of an analyte using a gas chromatograph. Furthermore modified Bakajin specifically mentions being used in gas chromatograph systems and as such it would have been obvious to directly connect the device of modified Bakajin to the inlet of a gas chromatograph in order to quickly and effectively convey analytes between the two said devices.

Finally as instant specification is silent to unexpected results, it would have been obvious to one of ordinary skill in the art at the time the invention was made to connect the two devices as described by Bakajin, i.e. a gas chromatography system and a miniaturized device used therein, since such modification would have involved making elements integral. Making elements integral is generally recognized as being within the level of ordinary skill in the art. In re Larson, 340 F.2d 965, 968, 144 USPQ 347, 349 (CCPA 1965).

Regarding claim 23 modified Bakajin discloses all the claim limitations as set forth above as well as the miniaturized device characterized in that the filling material is

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porous. (See Col. 2 Line 60- Col. 3 Line 12 where nanotubes have pores)

Regarding claims 24-26 modified Bakajin discloses all the claim limitations as set forth above as well as the miniaturized device characterized in that the chamber is formed on a carrier characterized in that the chamber is located on the surface of a carrier or that it is embedded in the surface of the carrier and characterized in that the carrier is a silicon wafer. (See Figure 1A-1D and Col. 3 Lines 50-65 where chamber is formed in or on a silicon substrate)

Regarding claim 34 modified Bakajin discloses all the claim limitations as set forth above as well as the miniaturized device characterized in that the chamber is formed in a shape of a channel. (See Abstract and Figure 3 where chamber is a channel)

Regarding claim 35 modified Bakajin discloses all the claim limitations as set forth above as well as the miniaturized device characterized in that the outlet can be connected to the inlet of a separation column. (See Bakajin Col. 5 Line 44- Col. 6 Line 10 where the device is used in and or as a separation column system and thus is fully capable of being connected to a separation column)

Furthermore regarding limitations recited in claim 35 which are directed to a manner of operating disclosed device, it is noted that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim.



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Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, it has been held that process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states “Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim.”

Regarding claim 36 Bakajin et al. discloses a process for the production of a gas chromatograph comprising a miniaturized separation column and a miniaturized device for the storage and/or enrichment of molecules or atoms, or both, especially for a miniaturized gas chromatograph, characterized by the following steps: (See Abstract

b) Providing a silicon substrate and forming an inlet opening and outlet opening in said substrate, (See Fig. 1 and Col. 3 Lines 50-57 where a silicon substrate is provided and a channel is etched into said substrate and thus an inlet and outlet are formed in the substrate.)

c) depositing at least one layer of filling material on said silicon substrate using Chemical Vapor Deposition (CVD), said layer comprising nanoscale carbon nanotubes, carbon nanofibers and/or fullerenes on to a carrier. (See Col. 3 Lines 25-45 where carbon nanotubes are deposited on the silicon substrate by utilizing CVD)

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d) Covering of said at least one layer of filling material with at least one whereby the layer of filling material and the cover layer are deposited in such a way onto the carrier that a channel is formed between the carrier and the cover layer, the channel containing the filling material, and whereby the inlet and outlet openings can be used to connect the channel to the outside world. (See Figure 1A-1D where cover layer 15 is deposited on the substrate to form a channel and Figure 3 where channel has openings to connect the channel to the outside world)

Bakajin et al. also appears to disclose a step of manufacturing the miniaturized separation column using microsystem technology. (See Col. 3 Lines 25-47)

Bakajin does not disclose the at least one cover layer being amorphous carbon.

Bailey et al. discloses the use of a layer of amorphous carbon, Diamond-Like carbon, which is deposited onto a substrate and used as a coating, i.e. cover and wherein said Diamond-Like carbon is deposited on objects using PECVD. (See Abstract and Col. 1 Lines 23-30)

It would have been obvious to one of ordinary skill in the art at the time of invention to deposit a layer of amorphous Diamond-Like carbon onto a device as described by Bailey et al. in the process for the production of a miniaturized device as described by Bakajin et al. because Diamond-Like Carbon is known in the art to provide

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a cover layer or coating as required by Bakajin (See Bailey Abstract and Col. 1 Lines 23-30 and also see Bakajin Col. 3 Lines 40-45) and Diamond-Like carbon is a known stable, hard, and scratch resistant material useful in coating, i.e. covering, and a wide variety of other applications. (See Bailey Abstract and Col. 1 Lines 8-30)

Furthermore assuming even if Bakajin does not disclose using microsystem technology to manufacture the device Bailey discloses depositing the amorphous layer using PECVD and therefore the device is manufactured, at least in part, using microsystem technology. (See Bailey Abstract where amorphous carbon is deposited via PECVD)

Modified Bakajin does not specifically disclose the step of connecting one of the openings to the inlet of the separation column.

Tipler et al. discloses a gas chromatography system where in there is a pre-concentrator comprising a chamber packed with a material therein to concentrate analytes. The outlet of the chamber is directly connected to the inlet of a separation column of a gas chromatograph. (See Fig. 6 and Col. 4 Lines 32-53)

It would have been obvious to one of ordinary skill in the art at the time of invention to connect the outlet of a chamber for concentrating materials as described by modified Bakajin et al. to the inlet of separation column of a gas chromatograph as described by Tipler et al. because it is well known in the art to connected the outlet of

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analyte concentrating chamber to the inlet of gas chromatograph separation column in order to perform accurate analysis of an analyte using a gas chromatograph.

Furthermore modified Bakajin specifically mentions being used in gas chromatograph systems and as such it would have been obvious to directly connect the device of modified Bakajin to the inlet of a gas chromatograph in order to quickly and effectively convey analytes between the two said devices.

Finally as instant specification is silent to unexpected results, it would have been obvious to one of ordinary skill in the art at the time the invention was made to connect the two devices as described by Bakajin, i.e. a gas chromatography system and a miniaturized device used therein, since such modification would have involved making elements integral. Making elements integral is generally recognized as being within the level of ordinary skill in the art. In re Larson, 340 F.2d 965, 968, 144 USPQ 347, 349 (CCPA 1965).

Modified Bakajin discloses all the claim limitations as set forth above as well as the process characterized in that the layer of filling material is deposited via Chemical Vapor Deposition (CVD) and the layer of amorphous carbon is deposited via Plasma Enhanced Chemical Vapor Deposition (PECVD). (See Bailey Abstract where amorphous carbon is deposited via PECVD and also see Bakajin Col. 3 Lines 46-50 where nanotubes are deposited using a CVD growth process)

While modified Bakajin may not specifically disclose the use of a Plasma Enhanced Chemical Vapor Deposition (PECVD) method for depositing the filling

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material it would have been obvious to one of ordinary skill in the art at the time of invention to use PECVD to deposit the filling material because PECVD represents one of a limited number of forms of CVD and a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, depositing a filling material, it is likely the product not of innovation but of ordinary skill and common sense.

Regarding claims 38-39 modified Bakajin discloses all the claim limitations as set forth above as well as the process characterized in that the area of the carrier, where the layer of filling material is deposited, is predefined by a catalyst layer of structured transition metal, previously deposited on the carrier characterized in that iron is used as the transition metal. (See Col. 3 Lines 50-65 and Figure 1A 12)

1. Claims 27-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over unpatentable over Bakajin et al. (US 7,290,667) in view of Bailey et al. (US 5,569,501) and in view of Tipler et al. (US 6,652,625) as applied to claims above, and further in view of Gordon (US 5,954,860).

Regarding claims 27 and 30, modified Bakajin discloses all the claim limitations as set forth above but does not disclose the miniaturized device characterized in that a

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heating unit is provided or the miniaturized device characterized in that a cooling unit is provided.

Gordon discloses a miniaturized device for use in a gas chromatography system comprising a tubular column packed with a material that absorbs analytes (See Col. 1 Lines 17-30) characterized in that a heating unit is provided and characterized in that a cooling unit is provided. (See Col. 1 Line 64- Col. 3 Line 34 and Figure 1 Heater 106 and Cooler 108)

It would have been obvious to one of ordinary skill in the art to use a heater and or cooler as described by Gordon in the device of modified Bakajin because heaters and coolers are known in the art to be used in gas chromatography systems comprising filled columns for separating or containing analytes as described by modified Bakajin and Gordon (See Bakajin Abstract, Col. 5 Line25-29, and Col. 3 Lines 46-61 and also see Gordon Col. 1 Lines 18-32 ) and coolers and heaters provide increased sensitivity and reduce the need for longer columns in such systems. (See Gordon Col. 1 Line 33- Col. 2 Line 10). The coolers and heaters further provide an effective way of changing environmental conditions to release analyte species captured in a channel as taught by modified Bakajin. (See Bakajin Col. 5 Lines 46-59 and Gordon Col. 1 Line 65- Col. 2 Line 10)

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Regarding claim 28, modified Bakajin discloses all the claim limitations as set forth above but does not specifically disclose the miniaturized device characterized in that the heating unit is located opposite to the side of the surface of the carrier with the chamber.

While modified Bakajin does not specifically disclose the heating element being located on the opposite side of the surface of the carrier of the chamber it would have been obvious to one having ordinary skill in the art at the time the invention was made place said heating element on the opposite side of the surface of the carrier of the chamber, since it has been held that rearranging parts of an invention involves only routine skill in the art while the device having the claimed dimensions would not perform differently than the prior art device, *In re Japikse*, 86 USPQ 70 and since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art, *In re Einstein*, 8 USPQ 167.

Regarding claim 29, modified Bakajin discloses all the claim limitations as set forth above as well as the miniaturized device characterized in that the heating unit comprises a resistive heating element (See Abstract) While modified Bakajin does not specifically disclose the resistive heating element being produced via thick-film or thin-film technology it would have been obvious to one of ordinary skill in the art at the time of invention to use a resistive heating element produced via thick-film or thin-film technology because thick and thin film resistive heating elements represent one of a limited number of types of resistive heating elements and a person of ordinary skill has

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good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense.

Furthermore since the instant specification is silent to unexpected result, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a thick or thin film resistive heating element because selecting one of known designs for a resistive heating element would have been considered obvious to one of ordinary skill in the art at the time of the invention and because said thick or thin film resistive heating element would operate equally well as the one disclosed by modified Bakajin

Furthermore regarding the recitation of a method of making said heating element, the examiner notes that the determination of patentability is determined by the recited structure of the apparatus and not by a method of making said structure. A claim containing a recitation with respect to the manner in which a claimed apparatus is made does not differentiate the claimed apparatus from a prior art apparatus if the prior art apparatus teaches all the structural limitations of the claim.

Regarding claim 31, modified Bakajin discloses all the claim limitations as set forth above as well as the miniaturized device characterized in that the cooling unit comprises a Peltier-element. (See Abstract)



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Regarding claims 32 and 33, modified Bakajin discloses all the claim limitations as set forth above but does not specifically disclose the miniaturized device characterized in that the cooling unit is located opposite to the side of the surface of the carrier with the chamber and characterized in that the cooling unit is located in a recess of the carrier.

While modified Bakajin does not specifically disclose the cooling unit being located opposite to the side of the surface of the carrier with the chamber it would have been obvious to one having ordinary skill in the art at the time the invention was made place said cooling unit opposite to the side of the surface of the carrier with the chamber, since it has been held that rearranging parts of an invention involves only routine skill in the art while the device having the claimed dimensions would not perform differently than the prior art device, *In re Japikse*, 86 USPQ 70 and since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art, *In re Einstein*, 8 USPQ 167.

Furthermore as instant specification is silent to unexpected results, it would have been obvious to one of ordinary skill in the art at the time the invention was made to place the cooling unit in a recess of the carrier since such modification would have involved making elements integral. Making elements integral is generally recognized as being within the level of ordinary skill in the art. *In re Larson*, 340 F.2d 965, 968, 144 USPQ 347, 349 (CCPA 1965).

***Response to Arguments***

2. Applicant's arguments filed 01/20/2011 have been fully considered but they are not persuasive.

Applicant argues on page 7 of the response that “The applicants submit that, in the Bakajin et al. device, analysis would only be possible if molecules are concentrated in such a way that molecules of identical molecular weight are concentrated and separated such that molecules having different molecular weight are separated from each other. Usually, this separation results in a spreading of the molecules within the gas stream which is the basic function of a separation column. Thus, the microfluidic sieve according to Bakajin et al. does not comprise both a miniaturized separation column and a miniaturized device for the storage and enrichment of molecules and/or atoms. The function of the Bakajin et al. device is closer to that of a separation column, but in any event, there is no disclosure in Bakajin et al. of a miniaturized device for the storage and enrichment of molecules and/or atoms, let alone such a device connected to a miniaturized separation column.”

It is the examiner's position that the device of Bakajin et al. is fully capable of both storage and enrichment of molecules, i.e. when molecules flow through the device they are stored therein and filtering, concentration, and separation of molecules are enrichments thereof. (See abstract and Col. 1 Line 65- Col. 2 Line 5) Applicant has not provided any evidence or convincing arguments that Bakajin et al. is not capable of

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such functions and as such modified Bakajin clearly reads on the claimed miniaturized device for storage and enrichment of molecules as is described in the rejections above.

Furthermore in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant also argues on page 7 of the response that "Moreover, the applicants submit that a skilled artisan would not have been motivated to modify the device of Bakajin et al., even in view of Bailey et al. and Tipler et al. to include any aspect of the claimed invention missing therefrom. Bakajin et al. teach that the disclosed microfluidic channel can provide the functions of separation, concentration, and filtering. Therefore, one of ordinary skill in the art would not have had a reason to add either a separate enrichment device or separation column. Without the benefit of the hindsight gleaned from the applicants' own disclosure, such an addition would have seemed duplicative and wasteful while unnecessarily increasing the cost of the overall device. Hindsight reconstruction of the prior art cannot support a § 103 rejection, as was specifically recognized by the CCPA in *In re Spinnoble*, 56CCPA 823, 160 USPQ 237, 243 (1969)."

It is the examiner's position that the combination of references as disclosed in the above rejections is proper and fully discloses and/or renders obvious the claimed invention. It is noted that the examiner did not rely on Bakajin et al. to teach both an

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enrichment device and a separation column but was merely used to show features of the claimed enrichment device. Tipler et al. was cited by the examiner and combined with the other cited prior art in order to show that it would have been obvious to one of ordinary skill in the art at the time of invention to utilize an enrichment device in conjunction with a separation column of a gas chromatograph in order to effectively analyze a desired material. Applicant has not addressed such the combination of references or explained why the combination does not teach all the claimed features.

Furthermore in response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Applicant argues on page 8 of the response that "This advantageous arrangement is not taught or suggested in the combination of cited references. For example, Bakajin et al. fail to a miniaturized device for storage and enrichment having a miniaturized separation column downstream thereof. The concept of providing first a device which concentrates and enriches molecules of a gas stream, without separating them, and then directing the concentrated and enriched block of non-separated molecules into a miniaturized separation column in order to then separate the molecules

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based on their molecular weights is not contemplated in the combination of cited references. Only this concept, as presented in the claimed invention, allows for a proper analysis of gas streams having low concentrations of molecules therein while achieving a good signal-to-noise ratio.”

It is noted that applicant once again is addressing the references individually, i.e. Bakajin et al alone, and in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Furthermore in response to applicant's argument that the prior art did not recognize the desired properties recognized by applicant, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Applicant argues on page 9 of the response that “none of the purposes disclosed in Bailey et al. is related to the purpose of the amorphous carbon layer in the subject invention, which is for storage and enrichment of molecules or atoms of a gas stream in a gas chromatograph. In addition, the applicants submit that the advantages disclosed in the Bailey et al. for the diamond-like carbon films would not have been relevant for a device as in Bakajin et al. and that a skilled artisan would not have had a reason to use

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the particular carbon film of Bailey et al with the Bakajin et al. device. The mere fact that the purported prior art could have been modified or applied in some manner to yield an applicant's invention does not make the modification or application obvious unless "there was an apparent reason to combine the known elements in the fashion claimed" by the applicant. *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 127 S. Ct. 1727, 82 U.S.P.Q.2d 1385 (2007). Also, an applicant's invention is not "proved obvious merely by demonstrating that each of its elements was, independently, known in the (purported) prior art." *Id.* Here, a valid reason could only be arrived at with the impermissible use of hindsight.

In summary, the combination of cited references fails to teach or suggest the advantageous arrangement in the claimed invention of a miniaturized device for storage and enrichment feeding into a miniaturized separation column. The primary Bakajin et al. reference discloses that a microfluidic channel can provide the functions of separation, concentration, and filtering, and one of ordinary skill would not have had a reason to add either a separate enrichment device or separation column, in addition, a skilled artisan would not have had a reason to modify the Bakajin et al. device with the carbon film of Bailey et al."

It is the examiner's position that the combination of references provided in the rejections above fully discloses and/or renders obvious the claimed invention.

In response to applicant's argument that there is no teaching, suggestion, or motivation to combine the references, the examiner recognizes that obviousness may be established by combining or modifying the teachings of the prior art to produce the

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claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988), *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992), and *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007).

In this case, it is noted that while Bailey et al. may not disclose the use of such diamond like carbon coatings/coverings in enrichment devices for gas chromatographs, Bailey et al. does disclose the use of the coatings/coverings in a wide array of applications including those for coating silicon and plastics, i.e. the materials which make up the device of Bakajin, as well as emphasizing the mechanical strength, thermal stability, and other desirable properties of the coatings/coverings which would also be recognized by one of ordinary skill in the art at the time of invention as properties desirable to employ in the device of Bakajin. The reference of Bailey et al. was cited to show that it is known in the art that amorphous carbon can be used to coat, i.e. cover, objects, including silicon wafers and other substrates, in order to provide a hard and temperature resistant material coating/covering which would have been obvious to one of ordinary skill in the art at the time of invention to use in the device of Bakajin.

### ***Conclusion***

3. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JONATHAN M. HURST whose telephone number is (571)270-7065. The examiner can normally be reached on Mon. - Thurs. 6:30-4:00; Every other Fri. off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Marcheschi can be reached on (571)272-1374. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should



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you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JONATHAN M HURST/

Examiner, Art Unit 1775

/Michael A Marcheschi/

Supervisory Patent Examiner, Art Unit 1775